Spring 2021

ME 315-006: Stress Analysis

Anthony Glick

ME315-006 – Stress Analysis

Meeting Times & Location:
W 11:00am – 1:50pm
Converged Learning Course in-person (CKB 303) and via Webex

Course Description:
ME315 is an introductory course in stress analysis in mechanical design.

Prerequisites:
ME215, Mech237, Math222

Textbook Required:
"Advanced Mechanics of Materials and Applied Elasticity – 5th Edition"
A.C. Ugural, S.K. Fenster
Prentice Hall, 2012

Instructor:
Mr. Anthony Glick
Office hours: Tu: 3:00 – 4:00pm, Th: 10:30 – 11:30am, via Webex or by appointment
Email: aglick@njit.edu

Course Objectives:
1. To develop skills for conducting stress analysis in mechanical design.
2. To provide a foundation for the study of machine design.

Topics:
1. Weeks 1 – 2: Analysis of Stress – stress transformation, principal stresses, Mohr's Circle

2. Weeks 3 – 4: Strain and Material Properties – normal and shearing strains, strain transformation, review for Exam 1

3. Week 5: Exam 1

4. Weeks 6 – 8: Stress-strain relations, strain energy, Problems in Elasticity – fundamental principles of analysis, plane stress, plane strain, stress concentration, Failure Criteria – failure theories, three dimensional stresses

5. Week 9: Spring Break

6. Week 10: Axisymmetrically Loaded Members – thick-walled cylinders, review for exam 2

7. Week 11: Exam 2

8. Week 12: Axisymmetrically Loaded Members – compound cylinders, rotating disks

9. Weeks 13 – 14: Application of Energy Methods – Castigliano's Theorem, virtual work, Ritz Method, Stability of Columns – stability of columns, allowable stress, eccentrically loaded columns

Grading:
Final Exam: 30%
2 Examinations: 22.5% each
Homework: 25%

ProctorU Record+

NJIT policy requires that all midterm and final exams must be proctored, regardless of delivery mode, in order to increase academic integrity. Note that this does not apply to essay or authentic based assessments. Effective beginning Fall semester 2019, students registered for a fully online course section (e.g., online or Hyflex mode) must be given the option to take their exam in a completely online format, with appropriate proctoring.

In this course you will be required to use the following proctoring method to ensure academic integrity for exams. Please see NJIT's response to questions about online proctoring. See below for more information about how exams will be proctored in this course.

ProctorU Review+ uses an automated proctoring solution via AI during the exam, followed by a full review from a ProctorU proctor. Similar to Respondus Monitor, you will be recorded during the exam. After completing their review, a proctor sends an incident report to the instructor if any potential academic integrity violations occur. You will access your exam by installing the ProctorU browser extension in either Chrome or Firefox. After logging into the browser, you can access your exam and proceed to the ProctorU startup sequences.

Students will need to make a test-taker account at proctoru.com.

In order to use this ProctorU service, you will need the following:

- High-speed internet connection
- Webcam (internal or external)
- Microphone and Audio (internal or external)
- Windows or Apple Operating System
- NJIT ID or Photo-Issued ID

After making your ProctorU account, download the browser extension for either Chrome or Firefox and log into your account via the browser extension. After logging into the browser, you can access your exam in your course and proceed to the ProctorU startup sequences. As long as you are logged into the browser with your ProctorU account, you will not need an exam password or access code; the browser extension will automatically enter that information to open the exam for you.

Important: ProctorU recommends that you visit https://test-it-out.proctoru.com/ to test your equipment prior to your proctoring session. We recommend you click on the button that says "Connect to a Live Person" to fully test out your equipment.

Important Notice for OSX Users: You will need to enable screen sharing in your browser **prior** to taking the exam.

If you encounter technical difficulties with your exam, you should contact ProctorU's 24/7 technical support via Live Chat or call 855-772-8678.

If you cannot access or obtain a webcam, please contact the Office of the Dean of Students for assistance.

Policies:

Homework submitted after due date will be penalized as follows: ½ credit if one week late and no credit beyond one week.

Statement on Academic Integrity:

Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at:

http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. ***Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university.*** *If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu.*